REMARKS

Claims 27-44 and 52-54 are presented for reconsideration. Claims 1-26 and 45-51 were canceled in previous Amendments. Claims 27, 37, and 43-44 are independent. Claims 28-36, 38-42, and 52-54 are dependent. Claims 5-9, 14-16, and 22 are sought to be amended. Claims 11-13 have been canceled. These changes are believed to introduce no new matter, and their entry is respectfully requested. Based on the above Amendment and the following Remarks, the Applicant respectfully requests that the Examiner reconsider and withdraw all rejections and pass claims 1-10, 14-17, and 22-28 to allowance.

Information Disclosure Statement

The Examiner requested that the non-patent publications cited in the Specification be provided to the Examiner if Applicants wish the Examiner to consider the references. Applicants filed an Information Disclosure Statement under 37 C.F.R. §1.97(b)(3) on March 20, 2001 citing many of the references. Additionally, in papers submitted herewith, Applicants filed an Information Disclosure Statement under 37 C.F.R. §1.97(c) citing the references in the Specification Applicants wish the Examiner to consider.

Objection to Specification

The Examiner objected to the title of the invention being included as a header to the Abstract. The Abstract has been amended to accommodate the objection. Accordingly, Applicants respectfully request that the Examiner withdraw the objection to the Specification.

Objection to Claims 37-44

The Examiner objected to claims 37-44 citing informalities. Claims 37, 39, 43, and 44 have been amended to accommodate the objections. Claims 38 and 40-42 properly depend from claims 37. Accordingly, Applicants respectfully request that the Examiner withdraw the objection to claims 37-44.

Rejection of Claims 27-44 and 52-54 Under 35 U.S.C. § 102(b)

The Examiner rejected claims 27-44 and 52-54 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,812,318 to Babbit et al. (hereinafter "Babbit"). A claim is anticipated only if each and every element of the claim is found in a single reference. (M.P.E.P. § 2131 *citing Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628 (Fed. Cir. 1987)). Applicants respectfully traverse the rejections.

The Specification has been amended to refer to associated parent applications and Applicants hereby request priority under 35 U.S.C. §120. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection to claims 27-44 and 52-54.

Rejection of Claims 37-38 and 41-42 Under 35 U.S.C. § 102(b)

The Examiner rejected claims 37-38 and 41-42 under 35 U.S.C. § 102(b) as being anticipated by the combination of U.S. Patent No. 5,867,304 to Galvanauskas et al. (hereinafter "Galvanauskas") and a detector, which the Examiner asserts is inherent in Galvanauskas.

A claim is anticipated only if each and every element of the claim is found in a single reference, either expressly or inherently (M.P.E.P. § 2131 *citing Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628 (Fed. Cir. 1987)). The Examiner must provide a rationale or evidence tending to show that a feature is inherent in the reference. (M.P.E.P. § 2112.) The mere fact that a certain characteristic may be present in the reference is not sufficient to establish the inherency of that feature. (M.P.E.P. § 2112 *citing In re Rijckaert*, 9 F.3d 1531 (Fed. Cir. 1993). (Emphasis in original.) To establish inherency, the extrinsic evidence must make clear that the missing feature is necessarily present in the thing described by the reference and that persons of ordinary skill would recognize that the feature is necessary. (M.P.E.P. § 2112 *citing In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999).

Applicants respectfully traverse the rejections. In particular, Applicants submit that each and every element of the claimed invention is not found in the cited reference either expressly or inherently.

For example, claim 37 recites "An optical waveform detector comprising: (a) a detector capable of detecting light pulses having a prescribed detectable address encoded temporal waveform; (b) a composite grating for receiving light pulses along an input path and transmitting light pulses to the detector along an output path, the composite grating comprising: (1) an active material: (2) an ordered assemblage of subgratings supported by the active material wherein ...."

First, Galvanauskas fails to teach or suggest, among other things, a composite grating comprising: (1) an active material: (2) an ordered assemblage of subgratings supported by the active material. Second, the Examiner has failed to provide a rationale or evidence tending to show that a detector is inherent in Galvanauskas. The mere fact that a detector may be present in Galvanauskas is not sufficient to establish that a detector is inherent in Galvanauskas. This is because inherency may not be established by probabilities or possibilities. Moreover, assuming for the sake of argument that the Examiner is correct in his assertion that a detector is inherent in Galvanauskas, the Examiner has failed to provide a rationale or evidence tending to show that a detector capable of detecting light pulses having a prescribed detectable address encoded temporal waveform is inherent in Galvanauskas.

Applicants therefore submit that each and every element of the claimed invention is not found in the Galvanauskas reference and that Galvanauskas does not anticipate claim 37. Claims 38 and 41-42 properly depend from a patentable claim and are therefore patentable as well. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections.

Rejection of Claims 37-38 and 40-42 Under 35 U.S.C. § 102(b)

The Examiner rejected claims 37-38 and 40-42 under 35 U.S.C. § 102(b) as being anticipated by R. Kashyap et al. Electronics Letters (hereinafter "Kashyap Electronics Letters"). Applicants respectfully traverse the rejections. Applicants submit that each and every element of the claimed invention is not found in the cited reference.

For example, claim 37 recites "An optical waveform detector comprising: (a) a detector capable of detecting light pulses having a prescribed detectable address encoded temporal waveform; (b) a composite grating for receiving light pulses along an input path and transmitting light pulses to the detector along an output path, the composite grating comprising: (1) an active material: (2) an ordered assemblage of subgratings supported by the active material wherein ...."

Kashyap Electronics Letters fails to teach or suggest, among other things, an optical waveform detector comprising: (a) a detector capable of detecting light pulses having a prescribed detectable address encoded temporal waveform. Applicants therefore submit that each and every element of the claimed invention is not found in the Kashyap Electronics Letters reference and that Kashyap Electronics Letters does not anticipate claim 37. Claims 38 and 40-42 properly depend from a patentable claim and are therefore patentable as well. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections.

Rejection of Claims 27-31, 33, 35-38, 40-44, and 52 Under 35 U.S.C. § 102(b)

The Examiner rejected claims 27-31, 33, 35-38, 40-44, and 52 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,530,666 to Kashyap et al. (hereinafter "Kashyap '666"). Applicants respectfully traverse the rejections. Applicants submit that each and every element of the claimed invention is not found in the cited reference.

For example, claims 27 and 37 each recites a "composite grating comprising: (1) an active material: (2) an ordered assemblage of subgratings supported by the active material ..." and claims 43 and 44 each recites a "grating comprising an ordered

assemblage of subgratings supported by an active material...." Kashyap'666 fails to teach or suggest, among other things, a composite grating comprising: (1) an active material: (2) an ordered assemblage of subgratings supported by the active material. Applicants therefore submit that each and every element of the claimed invention is not found in the Kashyap reference and that Kashyap does not anticipate claim 37. Claims 28-31, 33, 35-36, 38, 40-42, and 52 properly depend from a patentable claim and are therefore patentable as well. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections.

Rejection of the Claims 27 and 37 Under Obviousness-Type Double Patenting

In paragraph 6, the Examiner rejected claims 27 and 37 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of Babbit. In papers submitted herewith, Applicants have filed a terminal disclaimer disclaiming the terminal part of any patent granted on the present application that would extend beyond the expiration of the full term of U.S. Patent No. 5,812,318. Accordingly, Applicants respectfully request that the Examiner remove the rejection of claims 27 and 37.

CONCLUSION

The Applicant submits that all grounds for rejection have been properly traversed. Therefore, the Applicant respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections and pass claims 27-44 and 52-54 to allowance. The Examiner is invited to telephone the undersigned representative if the Examiner believes that an interview might be useful for any reason.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: 2/21/02

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VERSION OF SPECIFICATION WITH MARKINGS

An image can also be programmed into an active material to allow routing of an image encoded in a subsequent data beam. The simplest image is defined by two plane waves; generally, an image comprises multiple plane waves. The principles of the present invention as applied to plane-wave beams are directly applicable to combinations of plane wave beams. (Also, in the prior art, it is known that images can be stored and recalled from materials; [see, e.g.] see, e.g., U.S. Patent No. [5,256,637] 5,276,637.) Basically, such programming would involve the interaction of the material with an image-encoding set of direction beams (rather than a simple plane-wave direction beam).

VERSION OF CLAIMS WITH MARKINGS

27. A composite grating, comprising:

(a) an active material; and

(b) an ordered assemblage of subgratings supported by the active material for receiving input pulses along an input path and transmitting output pulses along an output path, wherein

(1) each subgrating satisfies a grating condition so as to diffract a respective subbandwidth of light from the input path to the output path, and

(2) the subgratings are configured such that (i) a first input optical pulse, incident to the active material along the input path and having a first prescribed input temporal waveform, produces an output optical pulse having a prescribed output temporal waveform and propagating along the output path, and (ii) a second input optical pulse, incident to the active material along the input path and having a second prescribed temporal waveform different from the first prescribed temporal waveform, does not produce an output optical pulse having the prescribed output temporal waveform and propagating along the output path.

28. The composite grating of claim 27, wherein the first input pulse and the output optical pulse at least partially spatially overlap.

29. The composite grating of claim 28 wherein the input pulses are received along the input path in an input direction and the output pulses are transmitted along the output path in a direction opposite to the input direction.

30. The composite grating of claim 27 wherein the prescribed output temporal waveform is a substantially temporally brief pulse.

31. The composite grating of claim 27 wherein the prescribed output temporal waveform corresponds to a substantially minimum temporal duration optical waveform.

32. The composite grating of claim 31 wherein the second prescribed temporal waveform is sufficiently orthogonal under cross correlation with the first prescribed temporal waveform as to produce substantially no substantially minimum temporal duration optical waveform from the composite grating when received thereby.

33. The composite grating of claim 31 wherein the second prescribed temporal waveform is sufficiently orthogonal under cross correlation with the first prescribed temporal waveform as to produce substantially no spike from the composite grating when received thereby.

34. The composite grating of claim 27 wherein the subgratings are supported on a surface of the active material, each respective subgrating satisfying the grating condition for the respective subbandwidth of light and the input path and the output path.

35. The composite grating of claim 27 wherein the subgratings comprise spatial variations in the refractive index of the active material.

36. The composite grating of claim 27 wherein the active material is a non-frequency-selective material.

37. (Amended) An optical waveform detector comprising:

(a) a detector capable of detecting light pulses having a prescribed address encoded detectable temporal waveform;

(b) a composite grating for receiving light pulses along an input path and transmitting light pulses to the detector along an output path, the composite grating comprising:

(1) an active material[:] ; and

(2) an ordered assemblage of subgratings supported by the active material wherein

(i) each respective subgrating satisfied at least one of [the] a Bragg condition [and the superficial] or a surficial grating condition so as to diffract a respective subbandwidth of light from the input path to the output path, and

(ii) the subgratings are so configured such that an input optical pulse interacting with the active material along the input path and having a prescribed input temporal waveform triggers an output optical pulse along the output path having the prescribed detectable temporal waveform, the prescribed detectable address encoded temporal waveform being different from the prescribed input temporal waveform.

38. The optical waveform detector of claim 37 wherein the subgratings are supported within a volume of the active material, each respective subgrating satisfying the Bragg condition for the respective subbandwidth of light and the input path and the output path.

39. (Amended) The optical waveform detector of claim 37 wherein the subgratings are supported on a surface of the active material, each respective subgrating satisfying the

[superficial] surficial grating condition for the respective subbandwidth of light and the input path and the output path.

40. The optical waveform detector of claim 37 wherein the input path and the output path are at least partially coextensive and wherein the input pulses travel to the composite grating in an input direction and the output pulses leave the composite grating in a direction opposite to the input direction.

41. The optical waveform detector of claim 37 wherein the subgratings comprise spatial variations in the refractive index of the active material.

42. The optical waveform detector of claim 37 wherein the active material is a non-frequency-selective material.

43. (Amended) A communications system comprising:

(a) a source of optical data; the data comprising optical light pulses, each pulse having one of a set of specific temporal waveforms;

(b) a detector capable of detecting an optical pulse having a prescribed detectable temporal waveform different from each of the set of specific temporal waveforms; and

(c) a composite grating arranged to receive the light pulses from the source and to transmit, in response thereto, output light pulses along an output path to the detector, the grating comprising an ordered assemblage of subgratings supported by an active material, wherein

(1) each respective subgrating satisfies at least one of [the] a Bragg condition [and the superficial] or a surficial grating condition so as to diffract a respective subbandwidth of light from the source to the output path, and

(2) the subgratings are so configured such that

(i) an optical pulse received from the source, interacting with the active material and having a prescribed one of the set of specific temporal waveforms, triggers an output optical pulse along the

output path having the prescribed detectable temporal waveform, and

(ii) an optical pulse received from the source, interacting with the active material along the input path and having one of the set of specific temporal waveforms other than the prescribed one, does not trigger an output optical pulse along the output path having the prescribed detectable temporal waveform.

44. (Amended) An optical-waveform-sensitive routing system comprising:

(a) a router responsive to change the routing of data in response to an optical pulse having a prescribed detectable temporal waveform; and

(b) a composite grating for receiving input light pulses along an input path and transmitting, in response thereto, output light pulses to the router along an output path, the grating comprising an ordered assemblage of subgratings supported by an active material wherein

(1) each respective subgrating satisfies at least one of (i) [the] a Bragg condition [and] or (ii) [the superficial] a surficial grating condition so as to diffract a respective subbandwidth of light from the input path to the output path, and

(2) the subgratings are so configured such that an optical pulse received by the composite grating, interacting with the active material along the input path and having a prescribed input temporal waveform different from the prescribed detectable temporal waveform, triggers an output optical pulse along the output path having the prescribed detectable temporal waveform.

52. The composite grating of claim 27, wherein the grating condition is a Bragg condition.

53. The composite grating of claim 27, wherein the grating condition is a surficial grating condition.

54. The composite grating of claim 34, wherein the grating condition is a surficial grating condition.